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TAT ACTIVITIES REPORT  
PRELIMINARY SITE ASSESSMENT  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

28 OCTOBER - 8 NOVEMBER 1985

Prepared by

Region X  
Technical Assistance Team  
TDD #10-8510-07

For

Region X  
Environmental Protection Agency

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TABLE OF CONTENTS

SUMMARY	1
SITE HISTORY	3
WORK DONE AT THE SITE	4
SITE ASSESSMENT	5
SITE CONDITIONS	7
GROUNDWATER WELLS	12
SAFETY CONSIDERATIONS	13
SAMPLING ACTIVITIES	16
Road Sampling	17
Transformer Inventory and Sampling	18
"Hot Spot" Soil Sampling	20
Container Sampling	22
Dioxin and Furan Sampling	23
Ship Creek Surface Water and Sediment Sampling	24
ANALYTICAL RESULTS	24
ROAD SAMPLES	25
TRANSFORMER SAMPLES	30
"HOT SPOT" SOIL SAMPLES	32
CONTAINER SAMPLES	36
DIOXIN AND FURAN SAMPLES	41
SHIP CREEK SURFACE WATER AND SEDIMENT SAMPLES	42
FUNDING SUMMARY	42
QUALITY ASSURANCE	43
FIELD REQUIREMENTS	44
LABORATORY REQUIREMENTS	46
PORTABLE GAS CHROMATOGRAPH REQUIREMENTS	46
QUALITY ASSURANCE RESULTS	47
TOXICITY OF CONTAMINANTS	48
POLYCHLORINATED BIPHENYL	48
HEAVY METALS	51
CYANIDE	51
CHLORINATED DIOXINS AND FURANS	52
FEDERAL REGULATIONS	54
DISPOSAL	56
CONCLUSIONS	57

TDD #10-8510-07  
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ANCHORAGE, ALASKA

**SUMMARY**

On 28 October 1985 an extensive site assessment and sampling effort was initiated at the Standard Steel and Metals Salvage Yard in Anchorage, Alaska (Figure 1). Lynn Tomich, of the EPA Emergency Response Team (ERT), Alaska Operations Office, and the Region X Technical Assistance Team (TAT) conducted the two-week investigation which was prompted by the analysis of two soil samples collected from a transformer storage area on 5 August 1985 by Alaska Department of Environmental Conservation (ADEC) personnel. These samples indicated PCB levels of 87,000 and 110,000 parts per million (ppm) in the soil. The ownership of the site is unclear at this time. The U.S. Department of Transportation, Federal Railroad Administration, owned the property at one time; however; property transfers during the change to a state-owned rail are in question. The 6.2 acre site has been leased to several different metal salvage companies since 1972 for a variety of recycling activities, including the reclamation of polychlorinated biphenyl (PCB)-contaminated transformers. Standard Steel began leasing the property in November of 1981 and has recently filed for bankruptcy.

The ERT and TAT site assessment was designed to inventory the materials onsite and to collect representative samples from surface soils, transformer storage areas, drainage pathways, and the incinerator onsite. These activities were hampered by the excessive amount of heavy salvage debris which is haphazardly arranged over the majority of the site. During this investigation, composite surface soil samples were collected from virtually all exposed areas. Results indicate widespread contamination from PCB, carrier solvents, and heavy metals. Significant levels of chlorinated dioxins and furans were detected in



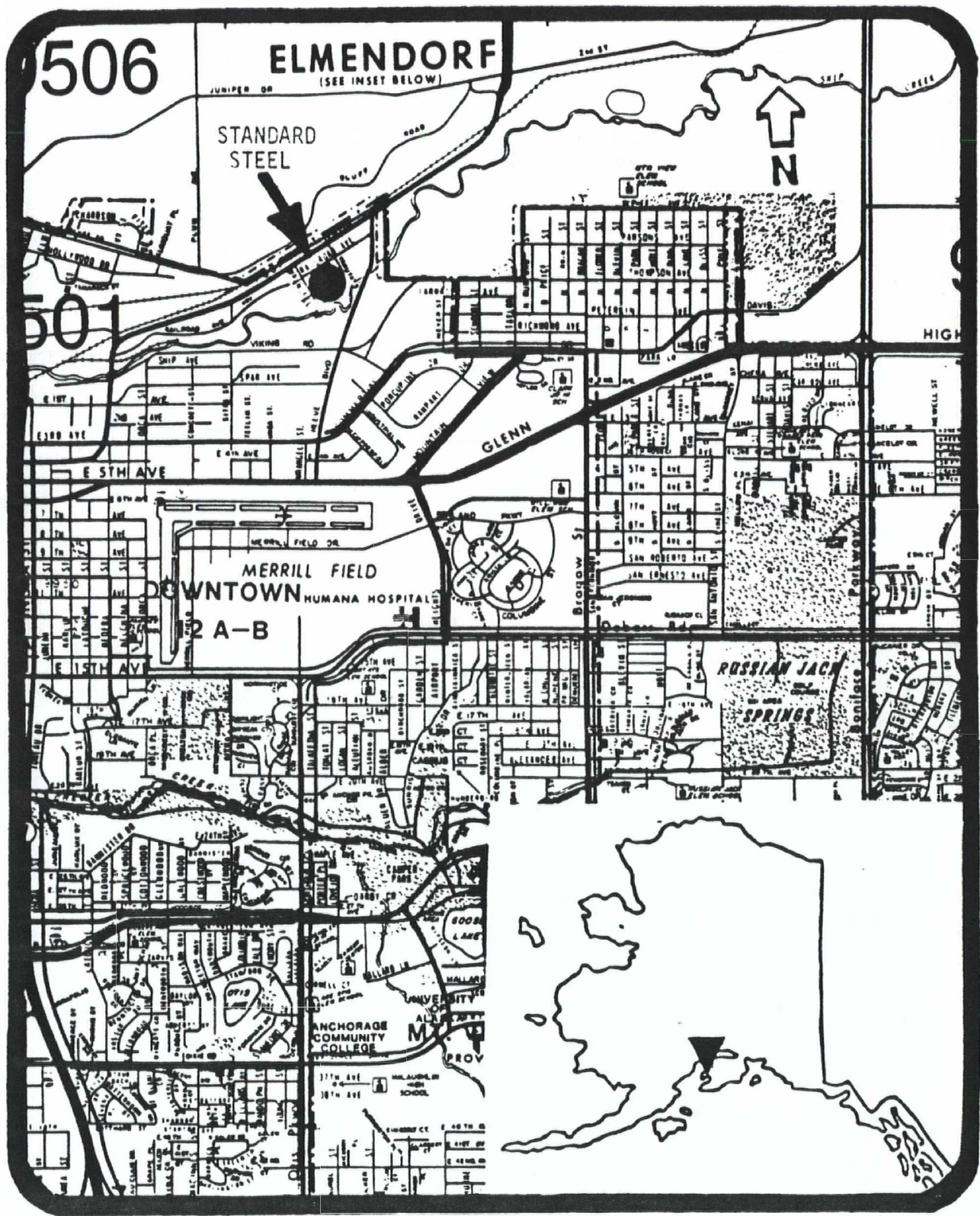


Figure 1  
Standard Steel and Metals Salvage Yard Vicinity Map  
Anchorage, Alaska



an onsite incinerator. Samples from the main transformer storage area indicated PCB levels as high as 165,000 ppm; and a downstream creek sediment sample collected from Ship Creek, which follows the southern border of the site, indicated 2.5 ppm PCB. During the investigation, 175 transformers were inventoried on the site. Forty were inaccessible to sampling personnel and 42 were empty. Of the remainder, six were found to contain PCB levels between 50 and 500 ppm, and four indicated PCB levels over 500 ppm.

High levels of PCBs, carrier solvents, and heavy metals in the soil at the Standard Steel site present several health and environmental hazards. This threat is compounded by the presence of chlorinated dioxin and furan contamination in the area of the onsite incinerator. There is evidence that PCB contamination has migrated offsite into Ship Creek and may have reached the shallow aquifer in the area. The Standard Steel site is unsecured and customers are often allowed to browse through metal debris for useable items. Employees continue to work in areas of high PCB contamination. Direct contact with contaminated soil, liquid, and debris is likely. The Anchorage Health Department has recently posted warning signs on the perimeter of the site and caution tape now surrounds the main transformer storage area. However, the imminent health and environmental hazards posed by the site and the threat of further offsite contamination should be addressed as soon as possible.

#### **SITE HISTORY**

The Standard Steel and Metals Salvage Yard is located in a heavily industrialized area of Anchorage, Alaska. The site was owned by the U.S. Department of Transportation, Federal Railroad Administration. The Alaska Railroad purchased the rail system but may not hold the property title yet. The site is currently leased to Norman Thompson of Ben Lomand, Incorporated. Mr. Thompson has sub-leased part of the property to several different metal salvage companies since 1972, and most recently (31 November 1981) to Gerald Poirer, the Standard



Steel Operator. Standard Steel has reportedly filed for bankruptcy. Mr. Poirer has stated to EPA personnel that the facility has accepted only empty transformers since beginning operations in December of 1982 and that any PCB-contaminated materials onsite are the responsibility of the site owner or the previous operator. There is evidence that several of these transformers were vandalized. An onsite incinerator was apparently utilized by operators prior to Mr. Poirer to burn off the excess oil on copper wires salvaged from the inside of electrical transformers. Mr. Poirer stated that these practices have not occurred under his management.

The 6.2 acre Standard Steel site is bordered by a steel fabrication company to the west, by a glass company and a rental company to the east, by railroad tracks and Railroad Avenue to the north, and by Ship Creek to the south.

The site is on a gently rolling outwash plain composed of highly permeable sand and gravel. The water table in the area varies from 15 to 40 feet below the surface. Because of the highly permeable soils and gentle topography in the area, runoff from the site is minimal and most water would be expected to percolate into the water table.

#### WORK DONE AT THE SITE

The EPA Alaska Operations Office (AOO), has inspected the Standard Steel site several times for compliance with federal regulations regarding the storage and handling of PCB-contaminated materials under the Toxic Substances Control Act (TSCA), 47 CFR Part 761. Inspections have revealed that written records on the transformers currently found on the site are not maintained.

Over a two-year period, and as the Agency's budget would allow, ADEC personnel have collected approximately 80 transformer oil samples. Subsequent laboratory results identified seven of these transformers as containing over 50 but under 500 ppm PCB. ADEC investigators estimated that there were 100 trans-



formers on the site, and planned to continue this intermittent sampling effort until all of the transformers were categorized. After receiving laboratory results, ADEC personnel returned to the Standard Steel facility and spray-painted the transformers which were found to contain PCB levels less than 50 ppm with a white-colored "OK," and those transformers containing between 50 and 500 ppm PCB with a red-colored "HT." ADEC and EPA personnel requested that the Standard Steel operators segregate these transformers, however, this has not been done.

On 5 August 1985, soil samples were collected by ADEC personnel from a stained area of the site where transformers were reportedly dismantled. There was also evidence that some of these transformers were vandalized. Laboratory analyses indicated the presence of 110,000 and 87,000 ppm PCB. Another soil sample collected from the same area by EPA personnel on 23 August indicated 36,000 ppm PCB.

PCB contamination was also found in other areas of the site. A soil sample collected by EPA personnel from the base of a large bulk storage tank indicated 75 ppm PCB and two soil samples collected in the vicinity of a large metal crusher that was reportedly serviced with transformer oil indicated 20 and 407 ppm PCB. An ash sample collected by EPA personnel from inside the incinerator confirmed the presence of PCB at 0.9 ppm, and PCB analysis of the soil in front of the incinerator door indicated 75 ppm.

#### **SITE ASSESSMENT**

Gregg Wagner, Bert Hyde, and Megan Davis (TAT) travelled to Anchorage, Alaska on 27 October 1985 to initiate the Standard Steel site assessment. Approximately 600 pounds of supplies and equipment had been previously sent to Anchorage via air freight. Arrangements were made with the Anchorage Fire Department to fill air tanks for sampling activities once the team arrived.

TAT personnel had prepared thorough safety and sampling plans prior to

travelling to Anchorage. The sampling plan contained a detailed section on quality assurance protocols, which were followed throughout the effort. TAT personnel made arrangements to borrow the McGraw-Edison PCB Test Kit from the Region IX EPA for field screening of transformer oil samples. Arrangements were also tentatively scheduled for the analysis of soil samples on the Region X EPA portable gas chromatographs, which are operated by the Region X Field Investigation Team (FIT).

TAT personnel compiled a Memo of Justification requesting \$18,000 in TAT Special Project funding for anticipated analytical services required during the Standard Steel site assessment. This was approved by the TAT National Project Officer, Jack Jojokian.

The scope of the proposed investigation to fully assess the hazards posed by the site included collection of the following samples:

- 1) Transformer oil samples,
- 2) Bulk tank samples,
- 3) A lubrication oil sample from the hydraulic metal crusher,
- 4) Upstream and downstream surface water and sediment samples from Ship Creek,
- 5) Composite surface soil samples from all exposed areas of soil on the site,
- 6) "Hot Spot" sampling of heavily stained surface soils from the following locations;
  - a) all transformer processing areas,
  - b) the main incinerator area,
  - c) the metal crusher,
  - d) the bulk storage tanks,
  - e) other oil stained areas onsite as necessary,



- 7) Composite ash samples from inside the incinerators for dioxin and furan analyses, and
- 8) A representative number of drum and container samples.

TAT personnel had initially proposed to collect additional samples from the following areas:

- 1) Samples of standing water onsite,
- 2) Groundwater samples obtained from onsite wells and other groundwater wells in the vicinity of the site,
- 3) Subsurface soil samples from the "Hot Spot" areas.

There are no wells on the Standard Steel site. Employees supply their own potable water in bottles. Information on groundwater wells in the vicinity of the site is provided in the Groundwater section of this report. Also, there were no areas of standing water because of the recent cold and dry weather. Subsurface soil samples could not be effectively collected by conventional means because the ground was frozen to a depth of five feet. Attempts to collect subsurface soil samples with the aid of a pick-ax were ineffective.

#### SITE CONDITIONS

Lynn Tomich, EPA AOO, and TAT personnel conducted a perimeter survey of the Standard Steel site on the morning of 28 October 1985. Difficulties were encountered while trying to locate a suitable area for the command post. The only area free of metal debris on Standard Steel property but far enough away from areas of suspected contamination is a very small parking lot that is usually filled with trucks picking up or delivering metal items. In addition, railroad cars to be loaded with metal debris are brought very close to this area and forklifts drive back and forth across the parking lot carrying loads to the railroad cars. These activities posed somewhat of a safety hazard for the team members.

The only other command post possibility was at the southern end of Yakutat

Avenue, an unpaved roadway which borders the eastern side of the site. However, the command post could not be located on Standard Steel property as there were no open areas along the Standard Steel side of Yakutat Avenue. In addition, this area is very close to the onsite incinerator gas stack and was suspected of being contaminated. TAT personnel decided to park the large cargo van they had rented at the southern end of Yakutat Avenue on 28 October, even though it was suspected that this location was not on Standard Steel property. Because this location was in clear view of an equipment rental company where customers may have become concerned after viewing response personnel in chemical protective gear, after one day it was moved to the Standard Steel parking lot. The van remained at this location for the duration of the effort. Originally, TAT personnel had also planned to set up work areas for activities such as preparing sample jars, and an area for decontamination and donning and doffing protective gear. However, this could not be accomplished in the cramped area in the parking lot. In addition, all gear had to be locked inside the van while team members were onsite.

There was no telephone, power, toilet, or running water available to response personnel near the Standard Steel site. These factors and the cold temperatures (often -10 degrees F at 0800 hours) made the usual field activities difficult and time consuming.

The Standard Steel site is essentially unsecured. There are two sections of six-foot chainlink fencing with gates that block off the main access roadway from the north. These two gates are locked at night. However, any area of the site can be reached by either entering the site along the railroad track, along Ship Creek at the southern end of Yakutat Avenue, or by climbing over or through piles of metal debris.

Nearly all of the surface area of the Standard Steel site is covered with



high piles of heavy metal debris. The only exposed soil is found along the one-lane unpaved roadways which wind throughout the site (Figure 2). Soils along these roadways were found to be oil-stained in several areas. Small pathways could be found winding through and sometimes over piles of debris. However, these pathways are usually quite narrow and expose very little area of soil for sampling purposes. TAT personnel had originally planned to set up a uniform grid network for soil sampling, however, after viewing the site it became obvious that this method was not possible. Another factor discouraging the use of a grid network was that items at Standard Steel are often moved to different locations on the site. Metal items are moved to new areas in order to gain access to salvageable objects. Instead of replacing the objects in the same location, new piles are moved to this area when another salvageable item needs to be uncovered. Items were often found in different locations daily. For example, one wooden pallet which contained three small cylindrical transformers was observed in four different locations during the two-week site assessment.

The northwest corner of the site is relatively free of metal debris compared with the remainder of the Standard Steel property. The soil also appears much cleaner in this area. It was reported to TAT personnel that the Ben Lomand Company is in the process of removing metal debris from this area to the south side of the railroad track (Figure 2) in order to segregate Standard Steel operations. Apparently a fence is to be built along this dividing line.

TAT personnel identified the following items among the various types of metal debris on the Standard Steel site: 175 transformers; one hydraulic metal crusher which was reportedly lubricated with transformer oil; one incinerator which was utilized to burn copper wire casings and transformer cores; two wood-burning stoves in which transformer oil was utilized to aid ignition; three bulk storage tanks; over 700 55-gallon drums, (which does not include the large cluster of approximately 400 apparently empty, horizontally stacked drums); an



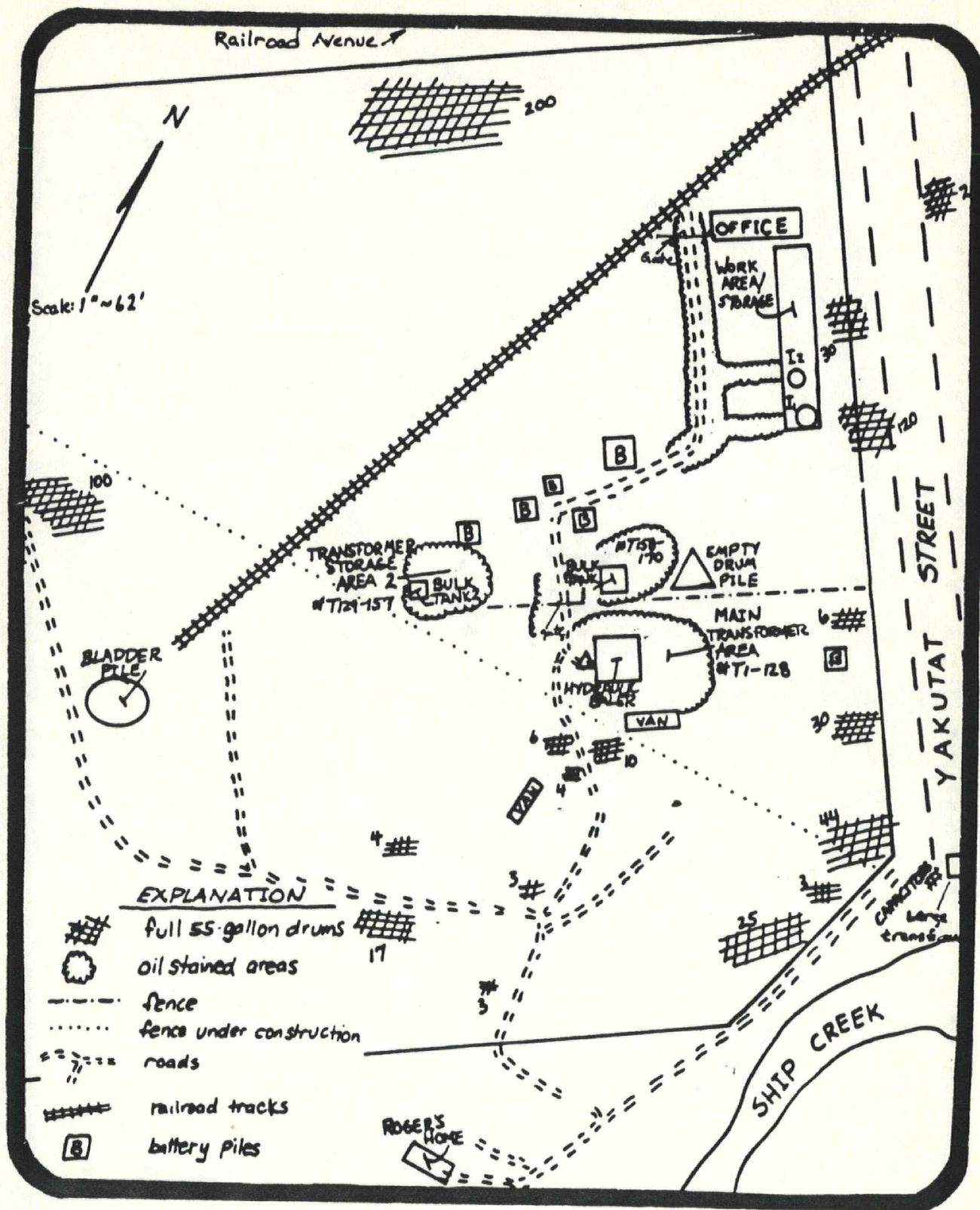


Figure 2

Site Diagram  
Standard Steel and Metals Salvage Yard  
Anchorage, Alaska



undetermined number of 5-gallon and other-sized containers; and approximately 20,000 batteries, many of which were observed to be leaking. The site contains many drums and pieces of equipment from military sources. Apparently a load of salvagable metal items from the Standard Steel facility was rejected because it contained live military ordnance. In addition, one large truck with an Atomic Energy Commission placard was noted near the main transformer storage area.

Although there is very little organization of items on the Standard Steel site, the majority of the transformers have accumulated in three main areas. Only 10 were found scattered in other areas of the site, six of which were found on the southern access road along Ship Creek, approximately 20 feet from the southern end of Yakutat Avenue. These transformers appeared to be fairly new.

One storm sewer was located near the southern end of Yakutat Avenue. This sewer discharges into Ship Creek and is approximately 30 feet west of the entrance to the Standard Steel southern access road. Sewer grates or other drainage access points leading into the storm sewer could not be located. Metal debris from the site is piled up to the bank along Ship Creek and in some cases into the creek. Debris can be seen under water and in the creek bed.

There are piles of soil and metal debris on the Standard Steel site that display indications of past burnings. Lynn Tomich recently received a report from a previous employee of one of the salvage companies which operated on the site prior to Standard Steel. This individual stated that past activities at the site have included utilizing transformer oil to ignite large piles of debris, which may have included transformer carcasses or cores. The informant volunteered to identify these locations. The presence of large piles of charred debris amidst soil which appeared to contain a high ash content, and the report of past burning activities, presents the possibility of chlorinated dioxin and furan contamination over large areas of the site. TAT personnel also noted

drums and piles of what appeared to be incinerator ash and pieces of charred wire casings in various locations about the site. The area of the incinerator is surrounded by such material. As previously mentioned, the gas stack from the incinerator is located approximately 15 feet west of Yakutat Avenue. This stack is relatively short and off-gas would probably not be carried far from the site. Assuming that the predominant wind direction is from the west, there may have been significant dioxin and furan contamination carried downwind and offsite by the off-gas of this incinerator.

Although Standard Steel has apparently filed for bankruptcy, there appeared to be five or six full-time employees working at the site. TAT personnel also noted customers onsite several times. Jerry Poirer, the Standard Steel operator, was not working during the site assessment. Standard Steel employees stated that Mr. Poirer had become ill several months ago and had not returned to work. The employees did not know the exact nature of the illness.

One Standard Steel employee lives in a small trailer on the south side of the site near Ship Creek. The employee indicated that he has often used transformer oil to start his wood-burning stove. He has recently been informed by Health Department and EPA personnel that he should not come in contact with transformer oil and should never use the oil for fires.

Three dogs are kept on the Standard Steel site. One apparently belongs to the employee that resides onsite and is tied to a post near his trailer. The other two dogs are German Shepherds. One is usually chained somewhere near the main entrance of the site, while the other dog is kept in an area west of the large incinerator.

#### GROUNDWATER WELLS

Information on wells in the vicinity of the Standard Steel site was obtained from Larry Dearborn, of the State Geological Survey Water Resources Division, on



17 October 1985. There are 21 wells within 1,500 feet of Ship Creek along Railroad Avenue. Eighteen of these wells are over 140 feet deep and are in an aquifer lying below a confining layer. The remaining three wells are in a shallower aquifer. These wells are unused and are over one-half mile from the Standard Steel site. The three wells are described as follows:

- 1) USGS Local Alaska #SB T13-R3-Sec 9 CABC 1-25: This well is 25 feet deep and owned by the Alaska Department of Fish and Game. It is located on Hall Road, past the military gate; 800 feet east of Reeve Boulevard; and approximately 450 feet from the Lower Hatchery Site.
- 2) USGS Local Alaska #SB T13-R3-Sec 9 CABC 1-16: This well is 48 feet deep and owned by the United States Geological Survey (USGS). It is located approximately 500 feet southeast of well #3 (below), and 500 feet from Reeve Boulevard, on the south side of Ship Creek.
- 3) USGS Local Alaska #SB T13-R3-Sec 9 CADC 1-17: This well is 17 feet deep and is owned by the USGS. This is the closest well to the Standard Steel site. It is located on the southwest corner of the cooling pond on the Elmendorf Hatchery, 250 feet east of Reeve Boulevard.

TAT personnel attempted to locate well #3, but were unable to enter the Elmendorf Military Reserve to gain access to the well. However, because these wells are probably up-gradient, and are over one-half mile from the site, it is unlikely that analysis of water samples would have indicated if contamination from the Standard Steel site has migrated into the shallow aquifer. Monitoring wells will need to be drilled on the Standard Steel site to make this determination.

#### SAFETY CONSIDERATIONS

Site assessment activities included: inventorying transformers, drums, and containers; and sampling soil, surface water, transformers, drums, and bulk tanks. Sampling of drums and containers other than transformers, involved

opening containers of essentially unknown, potentially pressurized materials. During container opening and sampling, personnel were dressed in Level B protection (self-contained breathing apparatus, one-piece PVC splash suits, viton inner gloves, nitrile outer gloves, steel-toe and steel-shank neoprene boots, and latex overboots).

PCBs, polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) have very low vapor pressures and if spilled onto the ground will readily adsorb to soil particles and therefore move with them whenever the particulate is mobilized as wind-blown or water-transported sediment. However, carrier solutions containing chlorinated aromatic hydrocarbons are usually present in PCB transformer fluids, and are much more mobile and volatile. Carrier solutions such as chlorinated benzene also pose an inhalation and contact hazard. Although these substances have been determined to be highly toxic, the hazard to field personnel in sampling contaminated solids, liquids, and ash can be reduced when protective equipment prevents direct dermal contact and inhalation. Before beginning sampling activities, TAT personnel surveyed the site with the HNU photoionizer to ascertain the level of organic vapors in the atmosphere. There were no detectable organic vapors on the site. TAT also surveyed the site with a radiation meter. No detectable levels of radiation were noted.

Confirmation of negligible organic vapor levels on the Standard Steel site, and knowledge of the behavior of PCBs, PCDDs, and PCDFs in the environment, enabled TAT personnel to operate in Level C protection (air-purifying respirators accompanied with the chemical protective clothing as described for Level B protection).

Cold weather conditions presented several problems during the sampling operation. Workers wore four or five layers of clothing under the PVC splash



suits, which made mobility difficult and cumbersome. The nitrile outer gloves, which were specially chosen for field work due to their superior resistance to chemical permeation, became totally rigid in the cold weather greatly reducing manual dexterity. The gloves had to be warmed on the cargo van heater to facilitate donning. Wool glove liners and Viton (the only available material impermeable to aromatic chemicals) inner gloves were worn under the nitrile outer gloves.

Face-mask to hood, glove to coverall, and boot to coverall seams are normally sealed with duct tape to prevent contaminants from entering these areas. This could not be done in this instance because the tape would not stick in the cold weather. Exhalation vapor often caused full face respirator exhalation valves to freeze shut. Fingers and feet became numb as personnel got out of the cargo van and prepared for site activities. Feet were the most severely affected, as the steel-toe and steel-sole inserts worn in the boots became extremely cold. Personnel could only remain on the site for a maximum of two hours before being forced to leave the site to warm up. Two individuals received superficial frostbite on their feet during the effort. Over-sized boots were eventually purchased in order to accomodate extra socks and a felt insert. Although these boots worked well enough to prevent further frostbite incidents, they did not alleviate the cold and discomfort experienced throughout the effort. These problems with equipment and cold temperatures made the donning and doffing of protective gear an ordeal which often restricted time onsite. Field activities were also limited by the brief period of daylight in the area in the late autumn and winter months.

During the last week of the effort, TAT personnel rented a small electric heater and warmed the back of the cargo van by plugging into an electric outlet on the Standard Steel office trailer. TAT personnel left the heater running while onsite, which made the removal of protective gear much more comfortable.



Decontamination was non-existent during the effort as there was no warm area available for keeping soap and water solutions from freezing. TAT personnel visqueened part of the floor of the cargo van and used this area for removing protective clothing. This situation was totally inadequate as there was not enough room to accomplish the removal of contaminated clothing safely and there was no room in the van for properly segregating contaminated equipment.

Sampling transformer oil is an activity in which contact between the oil and chemical protective gear cannot be avoided. Gloves and sample bottles were often covered with oil. In addition, many of the transformers at the Standard Steel site are themselves oily and TAT personnel had to climb on these transformers to obtain samples. In warmer weather, transformers are sometimes pressurized by the vapor of carrier solutions, and can spray liquid on samplers. Although this did not occur at the Standard Steel site, it was a possibility. If an individual had been splashed or if transformer oil had seeped into a seam and contacted the skin, there would have been no water available for emergency flushing of the skin. This presents an unacceptable risk to field personnel, which is the primary reason TAT personnel were reluctant to conduct additional drum sampling. In the future, lengthy sampling efforts which require substantial contact with hazardous materials, such as drum or transformer sampling, must be equipped with an adequate decontamination system including provisions for emergency showers, scrubbing stations, and emergency eye wash.

In addition, it would be worth the additional expense to rent a kerosene space-heater and erect some sort of three-sided shelter onsite for future cold weather efforts. The additional expense would be more than offset by the increased length of time personnel could work onsite.

#### SAMPLING ACTIVITIES

Prior to initiating sampling activities at Standard Steel, a general site



inventory and site diagram (Figure 2) was compiled by TAT personnel. Sampling activities included: soil sampling, sampling of all accessible transformers, Ship Creek surface water and sediment sampling, drum sampling, and ash sampling for dioxin and furan analyses. Sampling was initiated on 28 October and was completed on 6 November. Sample documentation was completed in accordance with the Region X ERT Quality Assurance Manual, and Chain-of-Custody was maintained for all laboratory analyses.

#### Road Sampling

As previously stated, there is very little exposed soil on the Standard Steel site. TAT personnel had originally proposed a sampling plan which included dividing the site into 50' X 50' grid sections. The high piles of heavy metal debris throughout the site made this impossible. The small dirt roadways were the only areas available for soil sampling.

Road sampling began on 28 October and was completed on 30 October. Samples were collected from the top 1/4-inch of the ground surface. Due to the frozen soil, this procedure was similar to scraping dust off of cement. All samples were collected with stainless steel spoons and placed in clean, pre-labelled, 8-oz glass jars obtained from the National Bottle Repository in Hayward, California.

TAT personnel collected 36 composite soil samples from 1900 linear feet of road surface (Figure 2). Sampling began at the northeast corner of the Standard Steel parking lot and then proceeded directly south along Yakutat Avenue. At the end of Yakutat Avenue, road sampling continued on the Standard Steel access road along Ship Creek, and then proceeded north along the roadway which runs through the center of the site to the office. The area of the office parking lot was split in two sections and sampled as well. Road sampling then continued along another roadway which runs from the center of the site to the northwest corner.

These composite road samples were collected every 50 feet, except for the

samples from the last 400 feet of the road which runs to the northwest corner of the site, which were collected every 100 feet. Efforts were made to sample primarily the oil-stained areas of soil within each 50 foot section. Discrete samples were collected from the oily areas of soil in the section into zip-lock plastic bags. The soil was then homogenized in the bag and placed into the sample jar.

Field Sample Tracking Sheets were maintained throughout the effort. All pertinent sampling information was recorded on these sheets. All road samples were analyzed for PCB content. Sample #SSS-16 was also analyzed for carrier solvents, heavy metals, and phenols.

#### Transformer Inventory and Sampling

A total of 175 transformers were inventoried on the Standard Steel site: 42 were found to be empty; 40 were inaccessible to sampling personnel; 28 had been previously sampled and categorized by DEC personnel; and 64 were sampled by TAT personnel and subsequently analyzed for the presence of the full range of PCB isomers.

- o Transformer Storage Area #1 - A detailed inventory of the transformers present in the main transformer storage area (#1) was compiled by Lynn Tomich and TAT personnel before actual sampling began. This inventory included assigning a number to each transformer, documenting all indentifying marks and label information, and a description of the container. Identification plates were often difficult to locate because of frost covering the transformers. In addition, transformers were often stacked on top of one another and placed so close together that the sides and tops were concealed.

A total of 128 transformers were inventoried in storage area #1. Transformers of all shapes and sizes were stored in a very haphazard



manner in this area. Several transformers were on their sides with access ports open and puddles of oil could be seen on the soil nearby. There were two stacks of transformers that were leaning precariously to one side.

Transformer sampling in area #1 began on 31 October and was completed on 4 November. Oil sampling required a three-person crew: two individuals would collect the sample, and one person maintained documentation and prepared the 40-ml glass vials for sample collection. Glass tubes were utilized to collect the samples. Information such as the color of the oil, and the estimated volume of oil in the transformers were recorded on the inventory sheet as the transformers were opened. Ten percent of the transformers that were marked with the spray-painted "OK" were sampled by TAT personnel for quality assurance purposes.

- o Transformer Storage Area #2 - Transformers were inventoried in a second storage area located approximately 20 feet northwest of the gate in the fence which borders the north side of transformer storage area #1 (Figure 2). Twenty-eight transformers were located in this area. EPA and ADEC personnel were not aware of these transformers, which were mainly the relatively large (over 200-gallon capacity) cubical type. Many of these transformers were stacked on top of each other and inaccessible to sampling personnel. The soil in this area was heavily oil stained. Sampling in this area was begun and completed on 4 November.
- o Transformer Storage Area #3 - A third transformer storage area, also unknown to EPA and ADEC personnel, was located in the area of the large bulk tank (Figure 2). Fourteen transformers were located in this area, 11 of which were found to be empty. The surrounding soil was again very dark and oil stained. In addition, this area contained charred trans-

former pieces, indicating that the location may have been used to disassemble and burn transformers. TAT personnel also collected a soil sample from this location for dioxin and furan analyses. Sampling of this area was initiated and completed on 5 November.

TAT personnel located ten additional transformers in various locations on the Standard Steel site. These transformers were also inventoried and sampled on 5 November.

#### "Hot Spot" Soil Sampling

A targeted approach was used to sample known or suspected areas of PCB contamination. These locations included: transformer storage areas #1, #2, and #3; and the floor of the hydraulic metal crusher. "Hot Spot" sampling was initiated on 30 October and completed on 5 November. Samples were collected with stainless steel spoons into clean, 4-oz glass jars. Soil in these areas was not frozen, apparently due to the high oil content. Samples were collected to a depth of two inches.

- o Transformer Storage Area #1 - A grid sampling network was set up for the collection of composite soil samples from this area (Figure 3), and 11 composite soil samples were collected for PCB analysis. One sample was also analyzed for carrier solvents, phenols, and heavy metals. The ADEC samples which indicated 110,000 and 87,000 ppm PCB had been collected from this area. TAT personnel attempted to collect soil from each oil-stained area of soil within a section; however, the majority of the soil in the area appeared to be oil-stained.
- o Transformer Storage Area #2 - Two composite soil samples were collected from transformer storage area #2. The distance from the roadway (which forms the northern boundary of this area) to the fence (which forms the southern boundary) was divided in half and a composite sample was col-



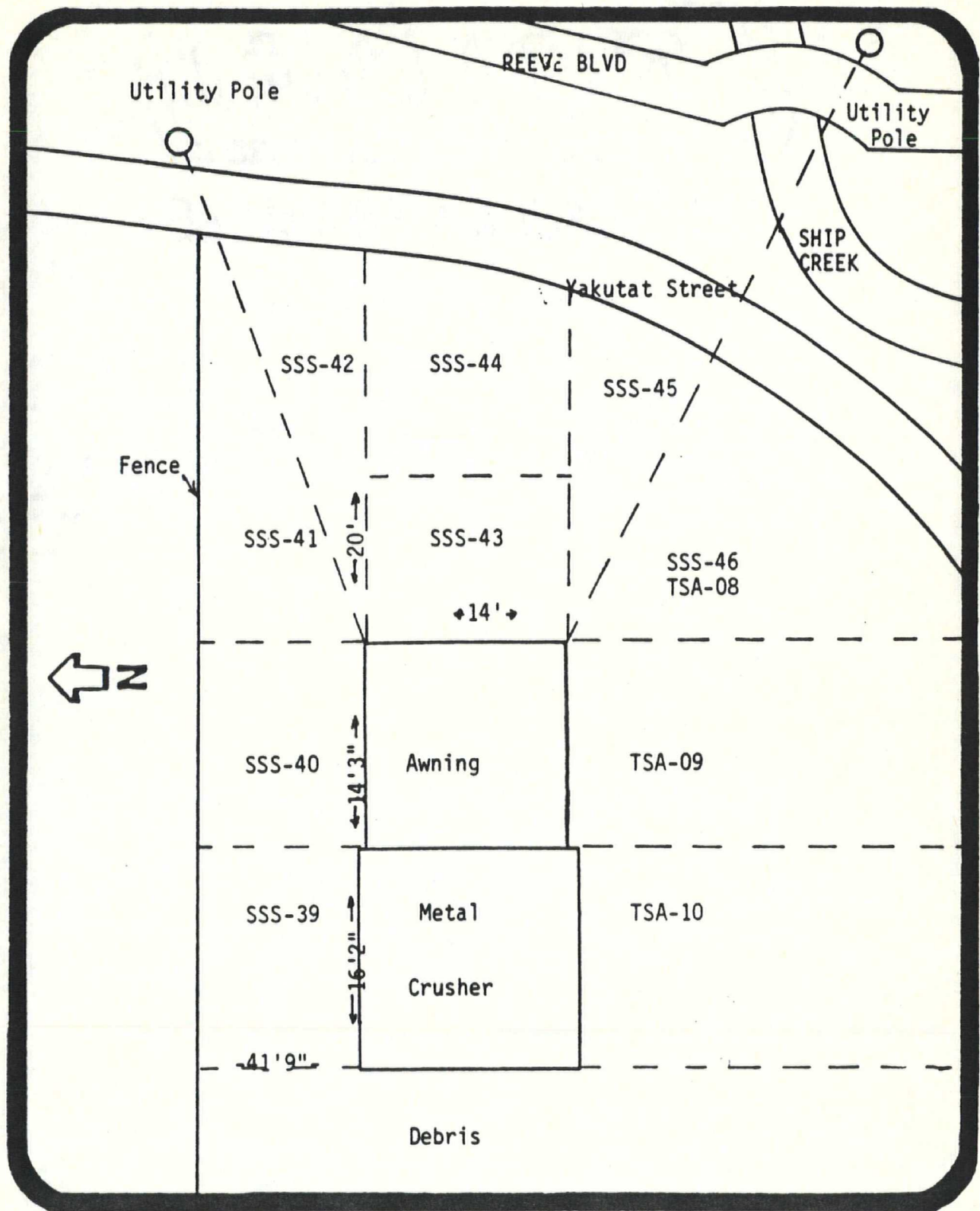


Figure 3

Sampling Grid  
Main Transformer Storage Area  
Standard Steel, Anchorage, Alaska

lected from each section. The soil appeared to be dark and oil saturated. Both samples were collected for PCB analysis, and one sample was also analyzed for carriersolvents, phenols, and heavy metals.

- o Transformer Storage Area #3 - One composite soil sample and one duplicate sample was collected from the third transformer storage area. A composite soil sample was also collected from this area for dioxin and furan analyses. The soil was again very dark and oily and there were several pieces of transformer parts, some of which appeared to be charred.
- o Hydraulic Metal Crusher - One composite soil sample was collected from the floor of the building which contains the hydraulic metal crusher. This machine is located within the main transformer storage area (#1). It has been documented that transformer oil was utilized for lubrication, and the machine reportedly was leaking oil constantly.

#### Container Sampling

Various types of containers were sampled during the Standard Steel site assessment. These included: samples from three bulk storage tanks, an oil sample from the lubrication chamber of the metal crusher, one 5-gallon can sample, and ten 55-gallon drum samples. All of the samples, except the 55-gallon drum samples, were placed into 40-ml glass vials and analyzed for PCB content. The 55-gallon drum samples were collected into clean 8-oz glass jars and were submitted for RCRA waste profile analyses in addition to PCB analysis.

- o Bulk Tank Samples - Three bulk storage tanks were inventoried and sampled by TAT personnel on 5 November. Bulk Tank #1 is in transformer storage area #3. The gray, 20-foot by 10-foot by 4-foot rectangular tank contains approximately 200 gallons of brown oil. Bulk tank #2 is located in transformer storage area #2. This 6-foot by 8-foot by 10-



foot cubical tank contains approximately one inch of brown sludge. Bulk tank #3 is a red, cylindrical tank of 500-gallon capacity, which is often moved to different locations by Standard Steel employees. Approximately one inch of brown oil remains in this tank.

- o Five-Gallon Container Sample - During the initial site survey on 28 October, TAT personnel discovered a 5-gallon can which had a label that read: "Dielectric Fluid- Avoid Skin Contact". The manufacturing date was given as November 1976. This can contains approximately three gallons of brown oil. TAT personnel collected a sample for PCB analysis on 5 November.
- o Lubrication Oil - TAT personnel collected an oil sample from the lubrication chamber of the hydraulic metal crusher. The chamber contained approximately five gallons of translucent, yellow oil.
- o 55-Gallon Drum Samples - On 6 November, TAT personnel donned Level B protective gear and sampled 10 55-gallon drums. TAT personnel had intended to sample drum types that represented a large number of the drums found on the site. This proved to be very difficult when the material inventory revealed that most of the drums on the Standard Steel site were dissimilar. It should be noted that many of the drums on the site were leaking or in containers of questionable integrity.

Drums #1 and #2 were located in transformer storage area #1 and each displayed a hand-written "Transformer Oil" label. These drums were full of a brownish yellow oil. The remainder of the drums sampled by TAT personnel contained brown oil; except drum #5, which contained a soapy-feeling material in a plastic lined drum (suspected of being an acid), and drum #10, which appeared to be a lighter weight, yellow oil.

#### Dioxin and Furan Sampling

Five soil and ash samples were collected and subsequently analyzed for the

tetra through octa isomers of the chlorinated dioxin and furan compounds. As previously stated, one soil sample was collected from transformer storage area #3 because of the presence of what appeared to be charred pieces of transformer parts. Two ash samples were collected from the inside of the main incinerator. One of these samples was collected for quality assurance purposes. Another ash sample was collected from the floor in front of the main incinerator, and the last sample was collected from the floor in front of the wood-burning stove that is located approximately 50 feet from the main incinerator. There appeared to be several other locations on the Standard Steel site with potential for dioxin and furan contamination, these areas should be investigated in the future.

#### Ship Creek Surface Water and Sediment Sampling

Upstream and downstream water and sediment samples were collected from Ship Creek on 1 November for PCB analysis. This high velocity stream follows the southern boundary of the Standard Steel site and is in contact with metal debris on the banks. Upstream samples were collected approximately 100 yards east of the Standard Steel eastern border. Downstream samples were collected approximately 100 yards west of the Standard Steel western border. Water samples were collected into specially cleaned one-gallon glass jars. Sediment samples were collected into clean, 8-oz glass jars.

#### **ANALYTICAL RESULTS**

After being collected from the Standard Steel site, samples were shipped to the Region X TAT office in Seattle, Washington. Chain-of-Custody procedures were maintained throughout the effort. Transformer oil samples were screened by TAT personnel with the McGraw-Edison PCB Test Kit and only those samples which indicated over 13 ppm PCB were submitted for laboratory analysis.

Samples were analyzed at two different commercial laboratories in Seattle to provide the best available sample turnaround and to improve data quality assur-



ance. Additional analytical services were provided by the Region X EPA Laboratory in Manchester, Washington; and by the Region X FIT laboratory in Seattle, utilizing the portable gas chromatographs. Complete laboratory analyses required 12 weeks. The last of the analytical results were received by TAT personnel on 20 January 1986, except for an isomer specific scan of the dioxin and furan samples to determine the presence of laterally substituted chlorine molecules, which was completed on 18 March 1986.

#### ROAD SAMPLES

The sample numbers, sample date, location description, and analytical results for PCB analysis of the road samples from the Standard Steel site are provided in Table 1. All of these samples were analyzed by the Region X EPA portable gas chromatographs. Two of these samples were submitted to Lauck's Testing Laboratory in Seattle, Washington as a quality assurance check. Sample #SSS-16 was also analyzed for carrier solvents, heavy metals, and phenols. Results of these analyses are provided in Attachment D of this report.

Road sample results indicate that widespread, low level PCB contamination exists in superficial road soils at the site. These results are particularly significant in view of the fact that samples were collected from only the top 1/4-inch of unfrozen surface dust. It is possible that PCB levels present on the roadways at the Standard Steel site are much higher than is indicated by this sample set. The major conclusions from the road sample results include the following:

- o The Standard Steel parking lot indicated 6 ppm PCB.
- o Low level PCB contamination (from 1 to 12 ppm) is present along Yakutat Avenue and the southern access road on the Standard Steel site.
- o The central roadway on the Standard Steel site (which is the access road to all three transformer storage areas) indicated PCB levels ranging 12 to 61 ppm.

TABLE 1  
RESULTS OF PCB ANALYSIS OF ROAD SOIL SAMPLES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)	
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S
SSS-01	10/28/85	Composite soil sample collected within the first 50 feet of the north entrance to the site.	3	
SSS-02	10/28/85	" 2nd 50 feet	3.9	
SSS-03	10/28/85	" 3rd 50 feet	4.1	
SSS-04	10/28/85	" 4th 50 feet	3.8	
SSS-05	10/28/85	" 5th 50 feet	7.3	
SSS-06	10/28/85	" 6th 50 feet	3.3	
SSS-07	10/28/85	" 7th 50 feet	2.0	
SSS-08	10/28/85	" 8th 50 feet	2.2	
SSS-09	10/28/85	" 9th 50 feet	1.0	
SSS-10	10/28/85	" 10th 50 feet	8.3	
SSS-11	10/28/85	" 11th 50 feet	4.6	



TABLE 1, ROAD SOIL SAMPLES, STANDARD STEEL (Continued)

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)	
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S
SSS-12	10/28/85	Composite soil sample collected within the 12th 50 foot section of the north entrance to the site.	7.2	
SSS-13	10/29/85	" 13th 50 feet	7.0	
SSS-14	10/29/85	" 14th 50 feet	10.5	
SSS-15	10/29/85	" 15th 50 feet	3.0	
SSS-16	10/29/85	" 16th 50 feet to end of road by bus	No Result	6.0
SSS-17	10/29/85	" 17th 50 feet	3.8	
SSS-18	10/29/85	" 18th 50 feet	8.0	
SSS-19	10/29/85	" 19th 50 feet	12	
SSS-20	10/29/85	" 20th 50 feet angled toward transformer area	53	
SSS-21	10/29/85	" 21st 50 feet	12	
SSS-22	10/29/85	" 22nd 50 feet	26	

TABLE 1, ROAD SOIL SAMPLES, STANDARD STEEL (Continued)

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)	
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S
SSS-23	10/29/85	Composite soil sample collected within the 23rd 50 foot section of the north entrance to the site. Including at base of 3 transformers.	34	
SSS-24	10/29/85	" 24th 50 feet up to fence	61	
SSS-25	10/29/85	" 25th 50 feet angled toward office (north)	59	
SSS-26	10/29/85	" 26th 50 feet including at base of 2 transformers	46	
SSS-27	10/29/85	" 27th 50 feet including several oily spots	39	
SSS-28	10/29/85	" 28th 50 feet	42	
SSS-29	10/29/85	Transfer Blank	Not Analyzed	
SSS-30	10/29/85	Duplicate of SSS-27	49	
SSS-31	10/29/85	" 29th 50 feet near pipe storage	12	
SSS-32	10/29/85	" 30th 50 feet next to office	15	



TABLE 1, ROAD SOIL SAMPLES, STANDARD STEEL, (Continued)

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)	
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S
SSS-33	10/29/85	West half of office parking lot	6.2	
SSS-34	10/29/85	East half of office parking lot	6.1	
SSS-35	10/30/85	Soil surface composite first 100 feet of West road	1.1	
SSS-36	10/30/85	" 2nd 100 feet	0.5	
SSS-37	10/30/85	" 3rd 100 feet	14	
SSS-38	10/30/85	" 4th 100 feet to 30 feet from end	102 (1260 + 1242)	

- o The remote northwest corner roadway indicated the lowest PCB levels of all of the Standard Steel road samples (0.5 and 1 ppm). However, 220 ppm PCB was indicated in the sample collected from the end of this roadway, at the northwest border of the site, again indicative of the widespread contamination present.
- o Sample #SSS-16 also indicated that heavy metal contamination (lead, copper, and nickel) is present on the site.

#### TRANSFORMER SAMPLES

Detailed information compiled during the transformer inventory and sampling effort, and the results of the field screening are on file in the Region X TAT office. A summary of this information, including categorization of the PCB-contaminated transformers, is provided in Table 2.

The McGraw-Edison PCB Test Kit measures the chloride ion content of a sample as an estimate of PCB concentration. Chlorine molecules are extracted from a transformer oil sample and transferred as chloride ions into an aqueous solution. Chloride ion concentration is then determined in the aqueous layer with a specific ion probe. The chloride probe is recalibrated every fourth sample. The kit is designed specifically to test transformer oil, and has been extensively used by EPA.

Unfortunately, the kit is not always accurate. Samples containing other forms of chlorine, chloride, and sulfur ions will produce a false positive result for PCBs during the test. Results can not be used to unquestionably classify a sample and the manufacturer recommends that if a sample reveals PCB levels close to the EPA classification limits of 50 or 500 ppm, a separate laboratory analysis should be performed in order to confirm the actual PCB concentration. Another problem with the test kit is that it does not work well in cold weather. Due to these concerns, all samples which indicated over 13 ppm



TABLE 2  
SUMMARY OF TRANSFORMER RESULTS  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

TRANSFORMER CATEGORIZATION

EMPTY TRANSFORMER #	NO ACCESS TRANSFORMER #	<50 PPM PCB TRANSFORMER #	>50 PPM PCB TRANS # (PCB CONC)	>500PPM TRANS # (PCB CONC)
8	3	1	69	14 (170 ppm)
13	10	2	70	30 (240 ppm)
73	11	4	71	34 (240 ppm)
76	12	5	72	90 ( 86 ppm)
93	19	6	75	142 (390 ppm)
94	25	7	78	169 (160 ppm)
95	26	9	79	
96	36	15	81	
103	37	16	87	
104	38	17	88	
105	40	20	89	
107	43	21	91	
108	44	22	92	
109	52	23	97	
112	53	24	98	
114	57	27	99	
117	58	28	100	
118	63	29	102	
130	64	31	111	
134	68	32	115	
136	74	33	116	
144	77	35	120	
145	80	39	121	
147	82	42	122	
148	83	45	124	
149	85	46	125	
150	86	47	126	
151	106	48	127	
152	110	49	129	
153	119	50	139	
155	123	51	140	
157	128	54	141	
158	131	55	143	
159	132	56	146	
160	133	59	154	
162	135	60	163	
164	137	61	171	
165	138	62	172	
166	156	65	173	
167	161	66	174	
168		67	175	
170				

PCB were submitted to A.M. Test Laboratory in Seattle, Washington for confirmational analysis. As an additional quality assurance check, 20 percent of the oil samples which indicated less than 13 ppm PCB on the McGraw-Edison Test Kit were also sent to A.M. Test for PCB analysis. As a further check on the accuracy of the A.M. Test results, six oil samples were split and sent to Lauck's Laboratory for analysis.

The following information was obtained through the transformer inventory and sampling effort:

- o Laboratory results identified six transformers on the Standard Steel site as containing over 50 but under 500 ppm PCB. Three of these transformers contain less than 1 inch of oil; two are full and have a total capacity of approximately 200 gallons. The remaining transformer in this category (#30) was classified by ADEC investigators and it is not known how much oil is contained in this transformer; however, it has a capacity of approximately 200 gallons.
- o Laboratory analysis identified four transformers as containing over 500 ppm PCB. The total approximate volume of oil in these five transformers is 250 gallons.
- o Forty transformers were not accessible to sampling personnel, usually because other transformers were on top or to the sides of the transformer, making sampling impossible. These transformers should be sampled and classified as soon as possible. A forklift will be needed to move these transformers before sampling can be accomplished.
- o Forty-two transformers were empty or contained only a very thin layer of oily residue in the bottom. For disposal purposes, these transformers may need to be swab-sampled and triple-rinsed if found to contain significant PCB contamination.



TABLE 3  
RESULTS OF PCB ANALYSIS OF "HOT SPOT" SOIL SAMPLES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)		
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S	EPA
SSS-39	10/30/85	TSA #1 Composite from plot north of baler (metal crusher) to fenceline	101		
SSS-40	10/30/85	TSA #1 Plot north of awning on baler	90		
SSS-41	10/30/85	TSA #1 Diagonal from NE corner of awning to utility pole	91		
SSS-42	10/30/85	TSA #1 From diagonal to east edge edge of border	87		
SSS-43	10/30/85	TSA #1 20 feet out from east side of baler	7,800		
SSS-44	10/30/85	TSA #1 20 to 40 feet out from east side of baler	225		
SSS-45	10/30/85	TSA #1 Diagonal from southeast corner of baler to utility pole across Reese Blvd.	19,023 (1242 + 1260)	120,000	165,000
SSS-46	11/05/85	Duplicate of TSA-08	7,400		

TABLE 3, ROAD SOIL SAMPLES, STANDARD STEEL (Continued)

SAMPLE NUMBER	SAMPLE DATE	LOCATION DESCRIPTION	ANALYTICAL RESULTS (ppm)		
			PORTABLE GAS CHROMATOGRAPH	LAUCK'S	EPA
TSA-08	11/5/85	TSA #1 From utility pole diagonal to east side of baler	11,000		
TSA-09	11/5/85	TSA #1 Plot south of awning on baler	400		
TSA-10	11/5/85	TSA #1 Composite from plot south of baler	2.4		
TSA2-01	11/5/85	TSA #2 Composite from south end of Bulk Tank #2	42.0		
TSA2-02	11/5/85	TSA #2 Composite from north end of Bulk Tank #2	36,000	500	218
TSA2-03	11/5/85	TSA #3	96		
TSA2-03B	11/5/85	Duplicate of TSA2-03	85		
BS-01	11/5/85	Composite from the floor of the hydraulic metal crusher	136		



## "HOT SPOT" SOIL SAMPLES

Results of the PCB analyses of soil samples collected from the three transformer storage areas, and from the floor of the hydraulic metal crusher building are provided in Table 3. Samples were analyzed on the Region X EPA portable gas chromatographs. For quality assurance purposes, three of these samples were also analyzed at Lauck's Laboratory. Two of these samples (SSS-45 and TSA2-02) were also analyzed for heavy metals, carrier solvents, and phenols. The results of these analyses are provided in Attachment D of this report.

- o Transformer storage area #1 indicated significant PCB contamination. Values ranged from 87.0 to 165,000 ppm. The 165,000 ppm sample was collected from the same area as the 110,000 ppm soil sample ADEC collected on 5 August 1985. The areal surface of this transformer storage area is approximately 100 feet by 100 feet. It is unknown as to what depth contamination has migrated into the soil. It should be noted that a shallow aquifer is reported to exist at approximately 15 feet below the ground surface.
- o Initially there were indications that transformer storage area #2 was contaminated with up to 36,000 ppm PCB. This result was from analysis by the portable gas chromatograph. To confirm this result, the same sample was submitted to Lauck's Laboratory for PCB analysis, where the result was only 500 ppm. This variation was considered to be unacceptable, indicating that at least one of these results was erroneous. This sample was subsequently submitted to the EPA laboratory in Manchester, Washington. Analysis indicated 218 ppm PCB. The contaminated portion of this transformer storage area is approximately 50 feet by 50 feet.
- o Transformer storage area #3 indicated PCB contamination at levels of 96 and 85 ppm. This is similar to the 75 ppm result of a sample previously collected from this area by EPA personnel. The contaminated surface

area in this location is estimated to be 50 feet by 50 feet.

- o The floor of the hydraulic metal crusher building indicated 136 ppm PCB. Samples collected by EPA personnel from this same location previously indicated 20 and 407 ppm PCB. The approximate dimensions of the building floor are 10 feet by 10 feet.
- o Both transformer storage areas #1 and #2 indicated lead, chromium, zinc, copper, and some cyanide contamination. High concentrations of carrier solvents were also observed. These results are provided in Attachment D.

#### CONTAINER SAMPLING

All container samples were analyzed at A.M. Test Laboratory. Samples were analyzed for PCB concentration and a RCRA waste profile analysis was also performed on the 55-gallon drum samples. A RCRA waste profile summary provides information such as sample description, reactivity, flammability, corrosivity, EP Toxicity, and total chloride content. EP Toxicity is a test for heavy metal and pesticide contamination. When appropriate, a special solvent analysis is performed also. Results of the PCB analysis of the three bulk tanks, the metal crusher lube oil, and the 5-gallon can are provided in Table 4. The 55-gallon drum sample results are provided in Table 5. Results of these analyses are summarized as follows:

- o The five gallons of lubricating oil from the hydraulic metal crusher are contaminated with 79 ppm PCB.
- o The 5-gallon can which displayed the "Dielectric Fluid" label did not contain any measurable level of PCB contamination.
- o All three bulk tanks located on the site contain less than 50 ppm PCB.
- o The 10 55-gallon drum samples did not contain significant PCB contamination. The results of the waste profile summaries indicate that only the contents of Drum #5 would be considered as a hazardous waste because



TABLE 4  
RESULTS OF PCB ANALYSIS OF MISCELLANEOUS CONTAINER SAMPLES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	DESCRIPTION	CONTENTS	ANALYTICAL RESULTS (ppm)	
				CHLORIDE PROBE SCREENING	AM TEST
B-01	11/5/85	Lubricating oil from the hydraulic metal crusher	Aprox. 5 gallons yellow oil	35	79
C-01	11/5/85	5-gallon can marked "Electrical Insulating Oil. Date of manufacture 11/76. Avoid prolonged skin contact"	3 gallons brown oil	unable to analyze	<1.0
BT-01A	11/5/85	20' X 10' X 4' Bulk Tank	1/2 full	35	20.1
BT-01B	11/5/85	Duplicate of BT-01A		25	16.8
BT-02	11/5/85	6' X 8' X 10' Bulk Tank	1 inch sludge in bottom	>500	3.5
BT-03	11/5/85	Bulk Tank #3. Red 500-gallon tank. "Greer Inc. 2921 International Airport Rd."	1 inch brown oil in bottom	35	28
D-04	11/6/85	Main transformer area. Black 55-gallon drum, 1/2 full. Bilayer	1 foot yellow oil on top of clear aqueous layer.		3.7
BZ-01	11/5/85	Split sample of B-01		35	75

TABLE 5  
 DRUM SAMPLE RESULTS, PCB AND WASTE PROFILE ANALYSES  
 STANDARD STEEL AND METALS SALVAGE YARD  
 ANCHORAGE, ALASKA

DRUM NUMBER	DRUM DESCRIPTION	CONTENTS	DESCRIPTION OF SAMPLE	PCB (ppm)	FLASHPOINT (degrees F)	CHLORIDE (ppm)	SPECIFIC GRAVITY
D-01	Black 55-gallon drum; "Transformer Oil" TSA #1	Full	Yellow oil	<1			
DZ-01	Split sample of D-01	"	"	<1			
D-02	Leaking, overfull 55-gallon drum; blue; main transformer storage area	Full	Black, light- weight oil; waste engine oil	22	294	270	
D02B	Duplicate of D-02	"	"	21	228	210	
D-03	Near bulk tank #1	Black sludge on frozen liquid	Black oil; engine oil	<1	420	650	
D-04	TSA #1; black, bilayer	1/2 full	Yellow oil	3.7			
D-05	200 ft. west of metal crusher; black drum	Full	Clear light-weight oil; water soluble; 30% water-probably glycerol	<1	170	1300	1.402
D-06	200 ft. west of metal crusher; black drum	Full	Brown oil	<1	258	240	



TABLE 5, DRUM SAMPLE RESULTS, STANDARD STEEL (Continued)

DRUM NUMBER	DRUM DESCRIPTION	CONTENTS	DESCRIPTION OF SAMPLE	PCB (ppm)	FLASHPOINT (degrees F)	CHLORIDE (ppm)	SPECIFIC GRAVITY
D-07	East of large drum pile; olive drum; UN 1863	Full	Dirty light oil; 78% solvent, 22% oil; boiling point (solvent)= 190 degrees F; mixed aliphatic/aromatic hydro- carbons	<1	190	240	0.785
D-08	Olive drum; "Dry- cleaning solvent"	Full	Brown light oil; similar to #7; more solvent than oil	<1	128	270	
D-09	Olive drum; "Dry- cleaning solvent"	3/4 full	Brown oil; hydraulic fluid	<1	225	390	
D-10	Olive drum; "Lube oil"	1/3 full	Yellow light oil	<1	350	300	
DZ-10	Duplicate of D-10	"	"		310	330	

this material exhibits a flashpoint of less than 140 degrees F. The remaining drums would not be classified as hazardous under the published EPA characteristics of a hazardous waste.

#### DIOXIN AND FURAN SAMPLES

The results of the dioxin and furan analyses are provided in Table 6 of this report. All five samples were analyzed for the tetra through octa-isomers of chlorinated dioxins and furans by California Analytical Laboratories in Sacramento, California. This includes an identification of any detected tetra-dioxin isomers to delineate whether or not 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is present. As indicated in Table 6, ash samples from the incinerator (DX-02 and DX-03) did indicate up to 4.2 parts per billion (ppb) tetra-chlorinated dioxins; however, subsequent analysis indicated that this is not the 2,3,7,8-TCDD isomer.

Significant levels of chlorinated dioxins and furans were present in all samples, suggesting that the burning of transformer oil did occur at the Standard Steel site. Studies have indicated that the combustion of PCB oil forms chlorinated dioxin in the ppb range and chlorinated furans in the ppm range. Although ppm levels of furans were not indicated, they were present in concentrations up to ten times greater than the corresponding dioxin isomer. Further information on the combustion of PCB transformer oil and the toxicity of the combustion products is provided in the Toxicity of Contaminants section of this report.

Although 2,3,7,8-TCDD was not detected in these samples, analyses to isolate the 2,3,7,8-substituted furans and further chlorinated dioxin and furan isomers were not performed during the initial analysis. Several of these compounds are extremely toxic, albeit not as toxic as 2,3,7,8-TCDD. Additional analysis to identify the presence of 2,3,7,8-substituted dioxin and furan isomers was com-



TABLE 6  
DIOXIN AND FURAN ANALYTICAL RESULTS  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA \*

SAMPLE #; LOCATION	DIOXINS (ppb)					FURANS (ppb)				
	ISOMER					ISOMER				
	TETRA	PENTA	HEXA	HEPTA	OCTA	TETRA	PENTA	HEXA	HEPTA	OCTA
DX-01; Transformer storage area #3	ND	ND	3.3	2.8	7.2	3.5	2.5	3.6	5.2	11
DX-02; Incinerator ash	4.2**	18	30	46	47	70	40	110	120	140
DX-03; Duplicate of DX-02	2.1**	22	37	73	8.9	86	150	140	180	89
DX-04; Floor in front of incinerator	ND	2.1	3.3	4.8	5.1	23	34	20	13	12
DX-05; Floor in front of wood-burning stove	ND	7.7	37	37	42	14	47	72	64	68
Laboratory Detection Limit on method blank	0.19	0.077	0.16	0.16	2.0	0.023	0.068	0.047	0.11	2.1
2,3,7,8 Toxicity Equivalent Factor (for non-2,3,7,8 substituted isomers)	0.01	0.005	0.0004	0.00001	0.0	0.001	0.001	0.0001	0.00001	0
2,3,7,8 Toxicity Equivalent Factor (for 2,3,7,8-substitued isomers)	1.0	0.5	0.04	0.001	0	0.1	0.1	0.01	0.001	0

\* = ND: Not Detected

\*\* = No 2,3,7,8 substituted isomers were indicated

pleted on the sample extracts on 18 March. Analytical results indicate that significant levels of laterally substituted isomers are present in the Standard Steel samples.

New procedures for estimating risks associated with exposures to mixtures of chlorinated dioxins and furans are discussed in the Toxicity of Contaminants section of this report. EPA has published a method for generating 2,3,7,8-TCDD Toxicity Equivalence Factors (TEF) for mixtures of dioxins and furans. The second analyses of the Standard Steel sample extracts provided the information necessary to determine the TEFs for these samples. These results are given in the "Toxicity of Contaminants" section.

#### SHIP CREEK SURFACE WATER AND SEDIMENT SAMPLES

The Ship Creek sediment samples were analyzed on the Region X portable gas chromatographs. Surface water samples were analyzed at the Region X EPA Laboratory in Manchester, Washington. Analysis of the surface water samples included special cleaning procedures which lowered the PCB detection limit to 0.1 ppb. The results of these analyses are listed below:

Sample Number	Sample Date	Sample Type	Location Description	PCB Concentration
SCS-01	11-1-85	Sediment	50 yards downstream of west border	2.5 ppm
SCS-02	11-1-85	Sediment	50 yards upstream of east border	<0.1 ppm
SCW-01	11-1-85	Water	50 yards downstream of west border	<0.1 ppb
SCW-02	11-1-85	Water	50 yards upstream of east border	<0.1 ppb

These results indicate that PCB contamination is migrating from the Standard Steel site. This is especially significant as the sample was taken at a point approximately 1/4-mile from the nearest transformer storage area.



## FUNDING SUMMARY

Special Project funding was utilized for the analyses of the majority of the samples generated during the Standard Steel site assessment. Originally, all samples were to be analyzed at private laboratories, with the exception of the two Ship Creek surface water samples, which were to be analyzed at the Region X EPA laboratory due to their capability to achieve a more sensitive detection limit for PCB in water.

Special Project funding approval was obtained from EPA Headquarters for a total of \$18,000. Analytical services were split among: Lauck's Testing Laboratory; A.M. Test, Incorporated; and California Analytical Laboratory; following the reception of competitive bids.

The total cost of analytical services required for the Standard Steel assessment was substantially reduced by utilizing the Region X EPA portable gas chromatographs and the McGraw-Edison PCB Test Kit. It is estimated that \$4,600 in analytical costs were saved by utilizing the portable gas chromatographs, and another \$1,500 was saved by screening transformer oil samples with the McGraw-Edison PCB Test Kit for a total project savings for laboratory analyses of \$6,100.

A listing of the actual analytical costs incurred by the project are as follows:

A.M. Test, Inc.	\$ 3,700.
Lauck's Testing Laboratory	\$ 700.
California Analytical Laboratory	\$ 6,500.
Total Special Project Costs =	<hr/> \$10,900.

## QUALITY ASSURANCE

The overall goal of the quality assurance program implemented by TAT personnel was to ensure that the environmental data obtained at the Standard Steel site is sufficiently accurate, precise, and legally defensible. To achieve this

goal, several quality assurance guidelines were employed throughout the effort. These guidelines are a summary of internal quality control practices established in the Region X Manual for Sampling Hazardous Materials (August, 1984), the Region X Quality Assurance Plan for Emergency Response Sampling (March, 1983), and the EPA Handbook for Analytical Quality Control in Water and Wastewater Laboratories (March 1979).

## **FIELD REQUIREMENTS**

### **Sample Containers**

All sample containers, except the Ship Creek surface water sample jars, were prepared and provided by the EPA Superfund Bottle Repository in Hayward, California. The Ship Creek surface water samples required specially cleaned one-gallon glass sample jars.

### **Sample Labeling**

All containers used for sample collection were labelled with stick-on labels. Sample labels contained the following information:

1. site name and location
2. sample dates and time
3. sample number
4. names of samplers

### **Sample Documentation**

All samples collected during the assessment were recorded on Region X EPA Field Sample Data and Chain-of-Custody sheets. Container contents and sampling data were entered on TAT sample tracking sheets which included: sample numbers, dates and times; any container labeling information; number and color of different phases; and sample destination. Similar sheets were utilized for water and soil samples. Additional sampling information was recorded in field log-books maintained by each member of the sampling team.

### **Transfer Blanks**

A complete set of empty sample containers, representing each of the para-



meters sampled, were carried unopened throughout the sampling activity. These empty containers were submitted to the laboratory with the samples collected during the survey. The laboratory fills these empty sample containers with distilled water and analyzes them along with the field samples.

#### Duplicate Samples

The following duplicate sample sets were prepared for the Standard Steel site assessment:

- o 10 percent of the soil samples for analysis on the Region X EPA portable gas chromatograph were split and submitted as blind duplicates.
- o 10 percent of the samples analyzed by the portable gas chromatographs were submitted to Lauck's Testing Laboratories for a laboratory accuracy comparison.
- o 20 percent of the transformer oil samples were split and submitted to the A.M. Test Laboratory as blind duplicates.
- o 20 percent of the transformer oil samples submitted to the A.M. Test Laboratory were split and submitted to Lauck's Testing Laboratory.
- o 20 percent of the transformer oil samples which indicated less than 13 ppm PCB by analysis on the McGraw-Edison PCB Test Kit were also submitted to A.M. Test Laboratory for confirmational analysis.
- o 10 percent of the 55-gallon drum samples were split and submitted to A.M. Test as blind duplicates for both PCB and waste profile analyses.
- o One ash sample was split and submitted as a blind duplicate to California Analytical Laboratory for dioxin and furan analyses.
- o 10 percent of the transformers that were previously sampled by ADEC personnel and marked with a spray-painted "OK" or "HI" were sampled and subsequently submitted for laboratory analysis to confirm the classification of these transformers.

## Analytical Methods

EPA-approved or recommended analytical methods and associated quality control (QC) procedures were used for the required analyses. The precision and accuracy of the methods were determined in accordance with EPA Guidelines for Assessing and Reporting Quality for Environmental Measurements.

### LABORATORY REQUIREMENTS

The following quality assurance program and documentation was required of all private laboratories utilized during the Standard Steel Project:

- o Internal spikes and duplicates - During sample analysis runs, the analytical laboratories generated and analyzed duplicate and spiked samples.
- o Calibration curves - The analytical laboratories performed a calibration run at the beginning of each work day using standards for each piece of equipment utilized. The calibration curves were to be made up of at least three points.
- o Chromatograms - Copies of standard and sample chromatograms were maintained by the laboratories.
- o Standards - Data on standards, standard acquisition, and origin of standards was provided to the TAT Quality Assurance Officer.

### PORTABLE GAS CHROMATOGRAPH

Quality assurance requirements for samples screened on the Region X portable gas chromatographs included analysis of the following:

- o Standard Aroclor 1260 and 1254 samples run daily,
- o 10 percent duplicate samples,
- o 10 percent spike samples,
- o 10 percent method blanks.

All data will be reviewed for quality assurance by the Region X FIT. This will include examination of raw data against established procedures, standards,



and criteria for interpretation. All analytical results will be entered into the EPA Region X Laboratory Data Management System.

Previous experience with the portable gas chromatograph laboratory has shown that analytical results are comparable to those of the private labs as long as values are above the minimum detection limits of the portable gas chromatographs. Detection limits for soil samples analyzed for PCB is 0.1 ppm. The current discrepancy in PCB values for the transformer area soil samples is currently under review by TAT, FIT, and Lauck's personnel and will be resolved based on quality assurance documentation maintained by the analysts.

#### QUALITY ASSURANCE RESULTS

##### Transfer Blanks

A listing of the transfer blanks included in sample sets from the Standard Steel site is included in Attachment B. Analysis of the five transfer blanks indicated no detectable levels of PCB contamination.

##### Duplicate Samples

A comparison of analytical results for the 22 sets of duplicate samples collected at the Standard Steel site is included in Attachment B. Eighteen of the duplicate sample sets indicated acceptable levels of variation, ensuring adequate laboratory precision and satisfactory results for field samples. Results have again indicated that the closer the values are to the minimum detection limit, the greater the percent variation within sets of duplicate samples. A similar increase in percent variation was found for the extremely contaminated samples.

The four duplicate sample sets which indicated wide variations in results are samples which were split and sent to different laboratories. Two sets were soil samples. After analysis on the portable gas chromatograph, TAT personnel selected the two samples which indicated the highest levels of PCB contamination

and submitted these samples for analysis at Lauck's Testing Laboratory. One set showed 99 percent variation and the other set indicated 84 percent variation. To resolve the discrepancy, these samples were submitted to the EPA Laboratory for reanalysis, which indicated that the results obtained from the portable gas chromatographs were in error.

A similar situation occurred with two duplicate sets of transformer oil samples. These oil samples were split and analyzed at A.M. Test and Lauck's Laboratories. The percent variation for the two samples was 93 and 90 percent. This variation was considered to be unacceptable and again the samples were submitted to the EPA Laboratory to determine the accurate value.

The McGraw-Edison PCB Test Kit proved to be less than 50 percent accurate in certain duplicate sample sets. After consulting with the manufacturer, it was surmized that this problem was due to the extreme cold temperatures the kit was subjected to in Alaska. Apparently, one of the reaction reagents is rendered less effective when stored below room temperature. However, this is not expected to be a problem due to the low concentration (13 ppm) that was set as the level at which a sample was submitted for confirmational analysis. Considering this conservative result and the general agreement between field and confirmational analyses, it is not expected that any of the oil samples which were not analyzed at a private laboratory are over 50 ppm PCB.

#### **TOXICITY OF CONTAMINANTS**

The main contaminants found to be present on the Standard Steel site include: PCBs and associated carrier solvents; heavy metals such as cadmium, copper, lead, and zinc; cyanide; and PCDDs and PCDFs. The toxicity of these contaminants is discussed below.

#### **POLYCHLORINATED BIPHENYL (PCB)**

PCBs were introduced commercially in 1929, and were manufactured in the U.S. by the Monsanto Company until 1977. PCBs are resistant to acids, bases, heat,



and oxygen. This extreme stability made them especially useful as a dielectric fluid in transformers and capacitors. They have also been utilized as plasticizers and solvents in plastics and printing inks. It is estimated that 4,000 tons per year enter the environment from the dumping and leaking of heat transfer fluids, lubricants, and hydraulic fluids into rivers and streams. Another 1,000 to 2,000 tons are discharged into the atmosphere by the combustion of plastics containing PCBs as plasticizers. Since PCBs are resistant to combustion, they mainly volatilize during low-temperature incineration.

PCB transformer oil often contains carrier solvents, such as trichlorobenzene or similarly chlorinated aromatic chemicals, to reduce the viscosity of the oil. These carrier solvents are highly volatile. Carrier solvents such as chlorinated benzene are suspect human carcinogens, and known human leukogens.

PCBs have been demonstrated to cause cancer in animals and are suspect human carcinogens. They are extremely stable in the environment. This fact and their high solubility in oils has resulted in PCB bioaccumulation in the fatty tissues of organisms throughout the food chain. Once absorbed by the organism, PCBs are not easily broken down and excreted, but are usually retained for long periods of time. PCBs have been detected in the tissues of plants and animals from all parts of the world, from remote polar regions to deep ocean sediments. Roughly 40 percent of the adult population of the United States is estimated to have positive fatty tissue levels of PCBs, with a mean level of approximately 1 ppm.

PCBs are easily absorbed through the skin, as well as by breathing PCB-containing vapors. However, PCB has a very low vapor pressure. PCBs are not soluble and will sink in water. They have an extremely high ignition temperature of approximately 1000 degrees Centigrade. Highly toxic, irritating gases containing chlorides and chlorine are emitted during PCB fires. The Threshold Limit Value, Time Weighted Average (TLV-TWA), for PCB is 1 microgram/m<sup>3</sup> (OSHA).

The Immediately Dangerous to Life and Health Value (IDLH) is 50 mg/m<sup>3</sup>. EPA has determined in its Ambient Water Quality Criteria that 0.079 parts per trillion would be expected to produce one additional case of cancer per million people.

In a study of PCB contamination, the EPA collected 1,600 samples of cows milk in 1973 and 1974. Analysis of the first 80 samples revealed an average PCB level of 1.7 ppm in whole milk; 16 samples had 2.5 ppm or higher in milk fat. The provisional federal tolerance level for PCBs is 2.5 ppm for whole cows milk.

PCBs do not exhibit immediate (acute) toxicity. It has been estimated that an average-sized adult would have to ingest or absorb a one-time dose of over one pound of Arochlor 1254 to reach a lethal level. A far more important concept with PCBs is that of chronic toxicity, or toxic effects acquired because of continual, low level exposure over time.

Most of the data on human toxicity of PCBs are from Japan, where food contamination was associated with an epidemic of an acne-like rash, headache, nausea, and diarrhea. Over 1,000 patients had eaten rice oil contaminated with PCBs that had leaked into the oil from a heat exchanger. The average concentration of PCB in the rice oil was found to be 2,000 to 3,000 ppm. Those persons who ate 0.5 grams or more (average consumption was 2 grams) developed darkened skin, eye damage, and severe acne.

Thirteen infants were born to exposed women: one was stillborn, four were small for gestational age, ten had dark skin pigmentation, four had pigmented gums, four had conjunctivitis, and eight had neonatal jaundice. Follow-up of some of these children at approximately 9 years showed slight but clinically important neurological and developmental impairment. Children whose mothers worked with PCBs and who were breast-fed stored the chemicals for up to 13 years. The level in the children's blood varied with the duration of breast-feeding.

This data should be interpreted cautiously for several reasons. These



individuals had ingested high PCB levels for a period of time that was later calculated to be 53 days. Even more importantly, they were ingesting components from the oil that had been repeatedly heated to high temperatures during the cooking process. These materials, known as dibenzo-furans, may be many times more toxic than the PCBs.

#### HEAVY METALS

Three soil samples from the Standard Steel site were analyzed for heavy metal concentrations. High levels of cadmium, copper, lead, and zinc were indicated in all samples.

Cadmium is not used in natural biochemical processes, and is extremely toxic. Its limit in drinking water is 0.01 ppm. The reason for the high toxicity evidently lies in its similarity to zinc; it can replace zinc in enzymes for example, but because of stronger bonding and perhaps stereochemical differences, the function of the enzyme is disrupted. Cadmium has been known to cause cardiovascular disease and hypertension.

Copper is an essential metal for many organisms. Like many essential metals, large amounts are toxic, and the limit in drinking water is set at 1 ppm. Copper is particularly toxic to lower organisms, and has been used as an algicide in lakes.

The toxicity of lead in the environment has caused extensive concern in recent years. The limit for lead in drinking water is 0.05 ppm. The toxicity of lead can be traced to the replacement of other metals in enzymes. The high levels of lead on the Standard Steel soil are likely to be from the lead-acid batteries stored on the site. It is important to note that in areas near battery spills, acidic conditions in the soil would tend to maintain the lead in solution, enabling it to migrate deeper into the ground. Lead has been known to cause brain damage, convulsions, and behavioral disorders in humans.



Zinc is a common metal, and is comparatively nontoxic. The maximum drinking water limit is set at 5 ppm. Although there may be lung effects from exposure to zinc dust, it is of low toxicity in solution.

#### CYANIDE

Up to 4.3 ppm cyanide was detected in soil samples collected from transformer storage areas #1 and #2. This compound does not exist in natural ecosystems. Physiologically, cyanides inhibit tissue oxidation and can cause death through asphyxia. Cyanide salts are relatively non-volatile unless they are acidified. After acidification, the highly toxic hydrogen cyanide gas is liberated. Exposure to small amounts of cyanide compounds over long periods of time is reported to cause loss of appetite, headache, weakness, nausea, dizziness, and symptoms of irritation of the upper respiratory tract and eyes.

#### CHLORINATED DIOXINS AND FURANS

Studies have proven that mixtures of chlorinated dioxins and furans are formed from the low temperature or incomplete combustion of polychlorinated biphenyls. During the late 1970s, the EPA was faced with assessing the human health significance of exposure to 2,3,7,8-TCDD. Research on 2,3,7,8-TCDD has been underway for more than two decades at an estimated cost in the hundreds of millions of dollars. The EPA's Cancer Assessment Group has stated that this chemical is the most potent animal carcinogen evaluated by the Agency to date. Exceptionally low doses elicit a wide range of toxic responses in many animals; e.g. adverse reproductive effects, thymic atrophy, and a "wasting syndrome" leading to death. The limited data that is available suggests that some of the 74 other chlorinated dibenzo-dioxins (CDDs) may have similar toxic effects. In addition, studies have indicated that some chlorinated dibenzo-furans (CDFs) exhibit "2,3,7,8-TCDD-like" toxicity.

The EPA's concern for CDDs and CDFs has expanded more recently. Data on emissions from combustion sources such as municipal waste incinerators and



contents in water from certain industrial production processes has indicated that the majority of the 75 CDD isomers and the 135 CDF isomers can be detected in the environment. CDDs and CDFs are extremely fat soluble and will bioaccumulate. A recent study by Queens Colleges Center for the Biology of Natural Systems indicated that 6.4 parts per trillion was the average 2,3,7,8-TCDD level in fat samples collected from 91 adults.

Recognizing the need to determine the risks inherent in exposure to mixtures of CDDs and CDFs, the EPA Chlorinated Dioxins Workgroup published a Position Document in November 1985 which describes the recommended procedure for generating the "2,3,7,8-TCDD equivalents" of complex mixtures of CDDs/CDFs. The Workgroup believes that it would be uneconomical and unnecessary to conduct similarly extensive testing as was done for 2,3,7,8-TCDD toxicity on each of the CDD/CDF isomers. An alternate, more practical approach was developed by the Workgroup. First, information is obtained on the concentrations of the isomers present in the mixture. Then, reasoning on the basis of structure-activity relations and results of short term tests, the toxicity of each of the components is estimated and expressed as an "equivalent amount of 2,3,7,8-TCDD." Combined with estimates of exposure and known toxicity information on 2,3,7,8-TCDD, the risks associated with the mixture of CDDs/CDFs can be assessed.

The cellular biochemical mechanisms leading to the toxic response resulting from exposure to CDDs and CDFs are not known in complete detail. However, over the last few years experimental data have accumulated which suggest that an important role is played by an intracellular protein, the Ah receptor. This receptor binds halogenated polycyclic aromatic molecules, including CDDs and CDFs. In animals, the binding of 2,3,7,8-TCDD-related compounds to this receptor has been correlated with the expression of several systemic toxic effects including LD50 values, thymic involution, chloracnegenic response, and the

induction of several enzyme systems, some of which have been linked to carcinogenic pathways.

Researchers have studied the causal relationships between the binding ability of the Ah receptor and the toxicity of CDDs and CDFs. This information, accompanied with the information published by Des Rosiers in 1984 on the concentration of CDDs and CDFs resulting from a PCB transformer fire were utilized to calculate the 2,3,7,8-TCDD Toxicity Equivalence Factor (TEF) of soot from PCB fires. The final TEF for soot generated from PCB fires was calculated to be equivalent to 45 ppm 2,3,7,8-TCDD. Presumably the transformer oil burned in this study was pure PCB.

The most toxic CDD/CDF isomers of concern and their related toxicity equivalence factors are summarized in Attachment C of this report.

The TEFs for the five dioxin and furan samples collected at the Standard Steel site were calculated following the receipt of the final analytical results on 18 March. The 2,3,7,8-TCDD toxicity equivalence for the Standard Steel samples are as follows:

DX01	0.17 ppb
DX02	4.76 ppb
DX03	5.71 ppb
DX04	1.61 ppb
DX05	2.48 ppb

#### FEDERAL REGULATIONS

PCB-contaminated materials are regulated under TSCA, 47 CFR Part 761. Regulations regarding the removal, transport, and disposal of PCB-contaminated materials are thoroughly addressed in the Federal Register and are relatively easy to comply with because there is an EPA-approved disposal site in Region X. However, this situation is totally different for CDD/CDF-contaminated wastes. Management and disposal of CDD/CDF mixtures generated from PCB transformer fires have not been specifically addressed under either TSCA or Resource Conservation



and Recovery Act (RCRA) regulations.

New regulations on dioxin and furan-containing wastes were published in the Federal Register (40 CFR Parts 261, 264, 265, 270 and 755) on 14 January 1985. These regulations went into effect on 15 July 1985. This document designates as RCRA acute hazardous wastes those materials which contain particular chlorinated dioxins and dibenzo-furans and regulates 2,3,7,8-TCDD under RCRA instead of TSCA. The RCRA definition of acute hazardous waste is a material which is not necessarily "acutely toxic" but so hazardous that they may, either through acute or chronic exposure, "cause, or significantly contribute to an increase in serious irreversible, or incapacitating reversible, illness" regardless of how they are managed. Although dioxin and furan mixtures generated from PCB incineration do not fit any of the EPA hazardous waste categories (#F020 to F028) referred to in this document (these categories deal with material associated with pentachlorophenol production) they apparently remain in the same classification as acute hazardous wastes and are subject to the same management and disposal instructions.

The EPA agrees that there is considerable variation in the acute and chronic toxicity of the various dioxin and furan isomers. However, because several of these isomers are very toxic, persistent, will bioaccumulate, and because these types of wastes usually contain a certain percentage of 2,3,7,8-TCDD, EPA has judged that they should be treated as acutely hazardous.

Regulations in the Federal Register require a special "Waste Management Plan" which would specify additional requirements for land disposal facilities intending to manage these wastes. EPA states that this additional permit requirement will, in the short term, lead to a shortage of facilities able to handle these materials. However, EPA believes that this problem will be alleviated, as it is at present, by the storage of these materials in tanks, containers, or enclosed waste piles at the site in which they are located. At

this time, there are no EPA-approved disposal sites for dioxin and furan-contaminated wastes. EPA believes that such storage will not, in the short term, be harmful to human health or the environment, and will reduce the pressure to permit a facility to handle these wastes immediately without a full evaluation of the facility's performance.

It should be noted that CDDs and CDFs are currently being examined to determine whether land disposal should be banned. The Agency has two years to study this question. Incineration is discussed as an option to land disposal in the Federal Register, and will be addressed in the Disposal section of this report.

#### DISPOSAL

As there are no EPA-approved hazardous waste disposal sites in Alaska; removal of PCB-contaminated soil, liquids, and debris from the Standard Steel site would involve containerizing the contaminated materials on site for subsequent shipment via barge. Solid materials such as soil and contaminated debris could be sent to EnviroSAFE Services of Idaho (ESI) in Grandview, Idaho for eventual landfilling. PCB-contaminated liquids would be transported to an approved disposal facility for incineration.

The additional costs of transporting these materials would make disposal extremely expensive. For this reason, it may be prudent at this time to consider the option of onsite incineration. GA Technologies, Incorporated, of San Diego, California, has applied for a TSCA permit for a portable incineration unit which would eventually be located in Anchorage, Alaska. The incinerator utilizes Circulating Bed Combustion (CBC) technology which is an advanced fluidized-bed system, distinct from conventional fluidized beds since it operates at much higher turbulence and combustion particle burnup.

Combustible waste and limestone are fed into the combustion loop along with



recirculated bed material from a hot cyclone. Both the bed material and the waste travel at high velocity through the reaction zone of the combustion chamber to the hot cyclone. Solids are separated from the hot combustion gas and reinjected into the combustion chamber. Hot flue gas passes through a convective gas cooler and a baghouse filter before exhausting to the atmosphere. The high air velocity and circulating solids create a highly turbulent combustion zone, resulting in a uniform temperature around the entire combustion loop. Wastes injected into the CBC are quickly volatilized by the inertia of the hot solids. Acid gases are absorbed by the large surface area of fine, circulating limestone.

GA Technologies has conducted a test burn of PCB-contaminated soil (10,000 ppm) for EPA officials at their CBC incinerator pilot plant in San Diego. Apparently this soil also contained 1,000 ppm trichlorobenzene. The Destruction and Removal Efficiency (DRE) was determined to be 99.9999+ percent. This "six nine" DRE capability is required for the incineration of PCB-contaminated materials. It is reported that there were no detectable levels of chlorinated dioxins and furans in the ash remaining inside the incinerator or in the dust collected from the flue gas filter.

EPA evaluation of the CBC incinerator is expected to be completed in March of 1986. If the permit is approved, GA Technologies plans to begin constructing the incinerator in Anchorage as soon as possible.

#### CONCLUSIONS

The health and environmental hazards presented by high levels of PCBs, PCDDs, PCDFs, organic solvents, and heavy metals present in the soil at the Standard Steel site must be reduced as soon as possible. Specific tasks to reduce this threat would include:

- o Further determination of the extent of contamination of surface and subsurface soil on the site for PCBs, PCDDs, PCDFs, organic solvents,

cyanide, and heavy metals.

- o Proper containment and disposal of hazardous materials present in the 55-gallon drums or other containers on the site.
- o Proper containment and segregation of PCDD and PCDF contaminated materials.
- o Removal and proper disposal or treatment of all PCB-contaminated soils, liquids, and debris in full compliance with 40 CFR Part 761.
- o Determination of the extent of contamination in groundwater by installation of onsite monitoring wells, and if required, treat groundwater to reduce contamination to acceptable levels.
- o Properly contain or dispose of the large battery piles on the site.
- o Construct a security fence around the site.

In the interim, Standard Steel customers and employees should be prevented from coming in contact with contaminated materials.

The Standard Steel Company has filed for bankruptcy and current property ownership is being researched. Should the property owner decline to stabilize the site, it is reasonable to assume that the Standard Steel site would become a primary candidate for a Superfund Removal Action. Should this occur, cleanup activities would be significantly accelerated by the use of at least one of the Region X portable gas chromatographs to determine the extent of contamination present on the site and to assess cleanup adequacy. It is estimated that utilizing a portable gas chromatograph could save as much as \$3,000 per day in analytical costs.



TAT ACTIVITIES REPORT  
STANDARD STEEL AND METALS SALVAGE YARD SITE ASSESSMENT

ATTACHMENTS

SITE PHOTOGRAPHS

Attachment A

QUALITY ASSURANCE SAMPLE RESULTS

Attachment B

TOXICITY OF DIOXIN AND FURAN ISOMERS

Attachment C

RESULTS OF METALS, PHENOLS, AND B/N/A ANALYSES

Attachment D

ATTACHMENT A

SITE PHOTOGRAPHS

STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA



ATTACHMENT B

QUALITY ASSURANCE SAMPLE RESULTS

STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

RESULTS OF ANALYSES OF TRANSFER BLANKS  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE SET	BOTTLE TYPE	LABORATORY	PCB CONTENT
SSS-29	Road sampling	Clear, 8-oz jar	Portable GC	Not Analyz
TBS-01	"Hot Spot" soil sampling	Clear, 4-oz jar	Laucks	<0.1 ppm
TBT-01	Transformer oil sampling	Clear, 40-ml VOA bottle	A.M. Test	<0.1 ppm
TBL-01	Transformer oil sampling	Clear, 40-ml VOA bottle	Laucks	<0.1 ppm
TBW-01	Ship Creek Water sampling	Clear, 1-gallon jar	EPA	<0.1 ppb



RESULTS OF ANALYSES OF DUPLICATE SAMPLE SETS  
ANALYZED AT DIFFERENT LABORATORIES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	SAMPLE SET	BOTTLE TYPE	LABORATORY	PCB CONTENT	% VARIATION
TSA2-02 TSA2-02	11/5/85	Soil, transformer storage area #2	Clear, 4-oz glass jar	Portable GC Laucks	36,000 500	99
SSS-16 SSS-16	10/29/85	Soil, roadway	Clear, 4-oz glass jar	Portable GC Laucks	No result 6.1	
SSS-33 SSS-33	10/29/85	Soil, office parking lot	Clear, 4-oz glass jar	Portable GC Laucks	6 10	40
SSS-38 SSS-38	10/30/85	Soil, roadway	Clear, 4-oz glass jar	Portable GC Laucks	102 220	54
SSS-45 SSS-45	10/30/85	Soil, main trans- former storage area	Clear, 4-oz glass jar	Portable GC Laucks	19,023 120,000	84
T-18 T-18	10/31/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	410 590	31
T-34 T-34	11/1/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	210 220	4
T-84 T-84	11/2/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	1000 730	27
T-139 T-139	11/4/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	6.9 100	93
T-142 T-142	11/4/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	390 38	90
T-169 T-169	11/5/85	Transformer oil	Clear, 40-ml VOA	A.M. Test Laucks	140 160	13

RESULTS OF ANALYSES OF DUPLICATE SAMPLE SETS  
ANALYZED AT SIMILAR LABORATORIES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	SAMPLE SET	BOTTLE TYPE	LABORATORY	PCB CONTENT	% VARIATION
SSS-27 SSS-30	10/29/85	Roadway soil sampling	Clear, 4-oz jar	Portable GC Portable GC	39 49	20
TSA2-03 TSA2-03B	11/5/85	Composite soil collected from area north of Bulk Tank #1	Clear, 4-oz jar	Portable GC Portable GC	96 85	12
D-01 DZ-01	11/6/85	Drum sampling	Clear, 4-oz jar	A.M. Test A.M. Test	<1.0 <1.0	0
SSS-46 TSA-08	11/5/85	Main transformer storage area. Composite sample collected from same area, but by 2 different samplers	"	Portable GC Portable GC	7,400 11,000	33
T-59A T-59B	11/1/85	Transformer oil	Clear, 40-ml VOA	A.M. Test A.M. Test	8.9 5.8	35
T-116A T-116B	11/4/85	Transformer oil	Clear, 40-ml VOA	A.M. Test A.M. Test	25 24	4
T-175 T-000	11/5/85	Transformer oil	Clear, 40-ml VOA	A.M. Test A.M. Test	2.0 <1.0	50
BT-01A BT-01B	11/5/85	Bulk Tank #1 sampling	Clear, 40-ml VOA	A.M. Test A.M. Test	20.1 16.8	16
B-01 BZ-01	11/5/85	Metal Crusher oil sample	Clear, 40-ml VOA	A.M. Test A.M. Test	79 75	5



RESULTS OF WASTE PROFILE ANALYSES ON DUPLICATE DRUM SAMPLES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

SAMPLE NUMBER	SAMPLE DATE	SAMPLE SET	BOTTLE TYPE	LABORATORY	WASTE PROFILE ANALYSES % DIFFERENCES
D-10 DZ-10	11/6/85	Drum sampling	Clear, 4-oz jar	A.M. Test A.M. Test	Flashpoint = 22% Chloride = 22% PCB = 5%
D-02 D-02B	11/6/85	Drum sampling	Clear, 4-oz jar	A.M. Test A.M. Test	Flashpoint = 3% Chloride = 9% PCB = 0%

ATTACHMENT C

TOXICITY OF DIOXIN AND FURAN ISOMERS

STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA



CDD/CDF ISOMERS OF MOST TOXIC CONCERN<sup>a/</sup>

DIOXIN		DIBENZOFURAN	
Isomer	TEF <sup>b/</sup>	Isomer	TEF
2,3,7,8-TCDD	1	2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDD	0.2	1,2,3,7,8-PeCDF	0.1
		2,3,4,7,8-PeCDF	0.1
1,2,3,6,7,8-HxCDD	0.04	1,2,3,6,7,8-HxCDF	0.01
1,2,3,7,8,9-HxCDD	0.04	1,2,3,7,8,9-HxCDF	0.01
1,2,3,4,7,8-HxCDD	0.04	1,2,3,4,7,8-HxCDF	0.01
		2,3,4,6,7,8-HxCDF	0.01
1,2,3,4,6,7,8-HpCDD	0.001	1,2,3,4,6,7,8-HpCDF	0.001
		1,2,3,4,7,8,9-HpCDF	0.001

<sup>a/</sup> In each homologous group the relative toxicity factor for the isomers not listed above is 1/100 of the value listed above.

<sup>b/</sup> TEF = toxic equivalency factor = relative toxicity assigned.

ATTACHMENT D

RESULTS OF METALS, PHENOLS, AND B/N/A EXTRACTIBLE ORGANICS ANALYSES

STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA



RESULTS OF METALS, PHENOLS, AND BASE/NEUTRAL/ACID EXTRACTIBLE ORGANICS ANALYSES  
STANDARD STEEL AND METALS SALVAGE YARD  
ANCHORAGE, ALASKA

PARAMETER	TSA2-02 (From TSA #2) (ppm)	SAMPLE NUMBER SSS-16 (Road Sample) (ppm)	SSS-45 (From TSA #1) (ppm)	TYPICAL RANGE IN SOILS (ppm)
Antimony	20	<2.5	8.8	
Arsenic	19	5.0	13.0	
Beryllium	0.4	0.5	0.5	3 - 40
Cadmium	34	1.8	17.0	0.01 - 7
Chromium	160	42	160	5 - 1000
Copper	1800	100	350	2 - 100
Lead	3900	260	1400	2 - 200
Mercury	0.6	0.1	0.2	0.02 - 0.2
Nickel	100	36	43	10 - 1000
Silver	0.7	0.2	0.5	
Zinc	10,000	200	750	10 - 300
Cyanide	1.8	<0.5	4.3	
Phenol	<0.5	<0.5	<0.5	
Di-methyl-pathalate	36.0			
Bis-2-ethyl-hexyl-pathalate	22.0	4.9	2.8	
Fluoranthene	5.7	2.6		
Phenanthrene		1.3	2.7	
1,2,4-trichlorobenzene		1.0	87.0	
Napthalene		1.0		
Detection Limit for B/N/A Extractibles	5.0	0.5	2.5	